

What is claimed is:

1. A water insoluble extraction reagent composition comprising: (a) an extractant selected from the group consisting of an aldoxime, a ketoxime, or a combination thereof; (b) an equilibrium modifier having a Brookfield viscosity of equal to or less than about 5 centapoise at 25°C and a flash point equal to or greater than about 141°F wherein the molar ratio of modifier to extractant is from about 0.05 to about 2.0 so as to provide a net copper transfer greater than that achieved in the absence of modifier.
2. The composition of claim 1 wherein the modifier is selected from the group consisting of: alcohols, carboxylic acid esters, oximes, nitriles, ketones, amides, carbamates, sulfoxides, ureas, and phosphine oxides.
3. The composition of claim 2 wherein the modifier is selected from the group consisting of nitriles, ether nitriles, di-alkyl ethers, ketones, esters, and alcohols.
4. The composition of claim 1 further comprising an α -hydroxy oxime, an α,β -dioxime or a combination thereof as a kinetic additive.
5. The composition of claim 4 wherein the α -hydroxy oxime is 5,8-diethyl-7-hydroxy dodecane-6-oxime.
6. The composition of claim 4 wherein the dioxime is a mixture of 1-(4'-alkylphenyl)-1,2-propanedione dioximes.
7. The composition of claim 1 wherein the extractant is 5-nonylsalicylaldoxime, 5-dodecylsalicylaldoxime, 5-octylsalicylaldoxime, 5-heptylsalicylaldoxime, and the 2-hydroxy-5-nonylacetophenone oxime and mixtures thereof.
8. The composition of claim 1 wherein the modifier is 2,6,8-trimethyl-4-

nonanone.

9. A process for recovery of copper from an aqueous solution containing copper values comprising (1) contacting the aqueous solution with an organic
5 phase comprising a water insoluble and water immiscible solvent solution of an extraction reagent composition comprising: (a) an extractant selected from the group consisting of an aldoxime, a ketoxime, or a combination thereof; (b)
an equilibrium modifier having a Brookfield viscosity of equal to or less than
10 141°F wherein the molar ratio of modifier to extractant is from about 0.05 to about 2.0 so as to provide a net copper transfer greater than that achieved in the absence of modifier; (2) separating the resultant copper pregnant organic phase from the resultant copper barren aqueous phase; and (3) recovering the copper values from the copper pregnant organic phase.

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10. The process of claim 9 wherein the modifier is selected from the group consisting of: alcohols, carboxylic acid esters, oximes, nitriles, ketones, amides, carbamates, sulfoxides, ureas, and phosphine oxides.

20 11. The process of claim 9 wherein the modifier is selected from the group consisting of nitriles, ether nitriles, di-alkyl ethers, ketones, esters, and alcohols.

25 12. The process of claim 9 wherein the extraction reagent composition is further comprised of an α -hydroxy oxime, an α,β -dioxime or a combination thereof as a kinetic additive.

13. The process of claim 12 wherein the α -hydroxy oxime is 5,8-diethyl-7-hydroxy dodecane-6-oxime.

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14. The process of claim 12 wherein the dioxime is a mixture of 1-(4'-alkylphenyl)-1,2-propanedione dioximes.

15. The process of claim 9 wherein the extractant is 5-nonylsalicylaldoxime, 5-dodecylsalicylaldoxime, 5-octylsalicylaldoxime, 5-heptylsalicylaldoxime, and the 2-hydroxy-5-nonylacetophenone oxime and mixtures thereof.

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16. The process of claim 9 wherein the modifier is 2,6,8-trimethyl-4-nonanone.

17. A method of making a low viscosity extraction reagent comprising adding to an extractant selected from the group consisting of an aldoxime, a ketoxime or a modifier having a Brookfield viscosity of equal to or less than about 5 centapoise at 25°C and a flash point equal to or greater than about 141°F wherein the molar ratio of modifier to extractant is from about 0.05 to about 2.0 so as to provide a net copper transfer greater than that achieved in the absence of modifier.

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18. The process of claim 17 wherein the modifier is selected from the group consisting of: alcohols, carboxylic acid esters, oximes, nitriles, ketones, amides, carbamates, sulfoxides, ureas, and phosphine oxides.

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19. The process of claim 17 wherein the modifier is selected from the group consisting of nitriles, ether nitriles, di-alkyl ethers, ketones, esters, and alcohols.

20. The process of claim 17 wherein the kinetic additive is an α -hydroxy oxime, an α,β -dioxime or a combination thereof.

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21. The process of claim 20 wherein the α -hydroxy oxime is 5,8-diethyl-7-hydroxy dodecane-6-oxime.

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22. The process of claim 20 wherein the dioxime is a mixture of 1-(4'-alkylphenyl)-1,2-propanedione dioximes.

23. The process of claim 17 wherein the extraction reagent composition is further comprised of an α -hydroxy oxime, an α,β -dioxime or a combination thereof as a kinetic additive.
- 5 24. The process of claim 17 wherein the modifier is 2,6,8-trimethyl-4-nonanone.